

Study/ Japan Rare Intractable Adrenal Diseases Study (JPAS/JRAS) study and retrospective cross-sectional analysis. The nationwide PA registry in Japan was established at 29 centers, including 15 university hospitals and 14 city hospitals. Patients, who were diagnosed PA between January 2006 and October 2016 and had available data of CCV events and DM, were enrolled (n=2,524). Logistic and liner-regression analysis for CCV events and renal parameters were performed. DM significantly increased the odds ratio of CCV events (OR 1.59, 95% CI: 1.05-2.41). DM also significantly increased the odds ratio of proteinuria (OR 2.25, 95% CI: 1.59-3.16) and had significant positive correlation with declines in eGFR ( $\beta=0.05$ ,  $p=0.02$ ). In conclusion, DM is an independent risk factor for CCV events and proteinuria in PA patients. We should pay attention to whether DM coexists with PA and treat both DM and PA to prevent the exacerbation of CCV diseases and kidney disease. (Supported by AMED grants No. JP17ek0109112/JP19ek0109352; National Center for Global Health and Medicine, Japan (27-1402/ 30-1008)).

## Thyroid

### THYROID DISORDERS CASE REPORTS I

#### *A Case of Diabetic Ketoacidosis Associated with Thyroid Storm*

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#### SUN-522

**Background:** Thyrotoxic crisis is a rare complication of diabetic ketoacidosis (DKA). We herein report a case of DKA and subsequent thyroid storm which required emergent tracheostomy possibly due to large goiter and post-intubation obstruction.

**Clinical Case:** A 26-year-old woman was admitted to our emergency department complaining fever (38.2°C) and palpitation. There was no history of autoimmune disease. Physiological examination revealed tachycardia (pulse rate 164/min), tachypnea (55/min), impaired consciousness with a GCS score of 13 (E3V4M6) and goiter. Endotracheal intubation was performed. Her laboratory tests showed metabolic acidosis (pH 7.255), marked high plasma glucose of 1,672 mg/dL, elevated HbA1c of 9.2%, elevated FT3 and FT4 with suppressed TSH. She scored 55 on the diagnostic criteria for thyroid storm of Burch & Wartofsky. Based on these findings, she was diagnosed as having DKA and thyroid crisis. The patient responded well to standard treatment which involves intravenous insulin infusion with pump, correction of electrolyte disturbances, use of methimazole, as well as propranolol. Meanwhile, the patient was positive for anti-glutamic acid decarboxylase (GAD) antibody, TSH receptor antibody, as well as thyroid stimulating antibody, indicating type 1 diabetes and Graves' disease. She underwent extubation on day 5, however, she developed wheezing around day 30. Imaging analysis demonstrated remarkable tracheal stenosis that is possibly due to large goiter and airway injury by intubation. Emergent tracheostomy was performed on day 50, because the dyspnea became progressively worse. Later, she was successfully treated by tracheal stent placement. At the follow-up period, the patient

was found to be doing well, with no severe hyperthyroidism or changes in bronchoscopic findings.

**Conclusion:** Thyroid storm is a rare but serious complication of DKA. Our report highlights the importance of considering airway obstruction due to large goiter especially in patients with a past history of prolonged ventilation.

## Thyroid

### BENIGN THYROID DISEASE AND HEALTH DISPARITIES IN THYROID I

#### *A Single Center Retrospective Analysis and Review of Endocrinopathies from Immune Checkpoint Inhibitors Between 2007 and 2017*

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#### SAT-414

Immune checkpoint inhibitors (ICI) specifically target and dysregulate immune tolerance. As a result of this immune activation, immune related adverse events (irAEs) are common. These can include endocrinopathies like immune hypophysitis (IH), primary adrenal insufficiency (PAI), autoimmune thyroid disease, Graves disease and type 1 Diabetes Mellitus (T1DM)[1]. The aim of this retrospective review was to describe the prevalence, timing, and clinical characteristics of ICI-related endocrinopathies at our institution. **Methods:** A retrospective chart review was conducted for all patients between January 01, 2007 and February 01, 2017 who met predefined clinical, biochemical and imaging criteria for endocrinopathies including IH, T1DM, autoimmune thyroid disease, Graves disease and PAI. **Results:** Among 690 patients who received ICPI during the study period, 91 unique patients with complete data developed endocrinopathies, for an overall prevalence of 13%. The study included 50 (55%) men and 41 (45%) women with a median age of 64 years (range 20-96 years). Grade 2 endocrinopathies were reported more commonly (n=49, 54%); grade 3/4 events were rare (15%). Among the ICIs, Nivolumab was the most common ICI noted for study patients (n=51, 56%). Autoimmune thyroid disease was the most common irAE in our study (n= 63, 9.1% overall prevalence). We also report 25 cases of IH (3.6%), 2 cases of PAI (0.3%) and 1 case of Graves disease (0.1%). Most patients with autoimmune thyroid disease developed subclinical hypothyroidism (n=26, 3.8%) and overt hyperthyroidism (n=21, 3.0%). We note a high median TSH of 67.3  $\mu$ IU/mL; range- 20.6-111.0 in overt hypothyroidism compared to subclinical hypothyroidism (14.0  $\mu$ IU/mL; range- 5.6-100  $\mu$ IU/mL). Overall, median time to developing any endocrinopathy after initiating ICI was 13.7 weeks; range- 0.7-351.5 weeks. Among the subjects who developed IH, the median TSH was 0.37  $\mu$ IU/mL (0.01 - 62.39  $\mu$ IU/mL) with a free T4 of 0.74 ng/dL (0.25-1.86 ng/dL) and the median cortisol was 0.80  $\mu$ g/dL (0.25-24.5  $\mu$ g/dL). Amongst the IH group, 17 patients developed isolated secondary adrenal insufficiency and 8 patients developed combination of other hormone

deficiencies with secondary AI including 6 with secondary hypothyroidism, 1 patient with hypogonadotropic hypogonadism and 1 with hypothyroidism and hypogonadism in addition to secondary AI. Despite development of irAEs, ICI therapy was continued in 59 pts (65%) who developed an endocrine irAE. **Conclusions:** In summary, this is one of the largest single institution retrospective studies on ICI related endocrinopathies. The majority of endocrinopathies were low grade, and most patients continued ICI treatment. Reference: Barroso-Sousa, Romualdo. Incidence of Endocrine Dysfunction Following the Use of Different Immune Checkpoint Inhibitor Regimens: A Systematic Review and Meta-analysis. JAMA, Sept 2017

## Adrenal

### ADRENAL - HYPERTENSION

#### *Role of Female Gender and Subcutaneous Fat in the Positive Association of Obesity with Idiopathic Hyperaldosteronism*

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#### MON-210

**Context:** Primary aldosteronism (PA) is the most frequent cause of secondary hypertension. The relationship between PA and various metabolic disorders including obesity, diabetes mellitus and dyslipidemia has been reported. On the other hand, PA consists of two main subtypes: unilateral aldosterone-producing adenoma (APA) and the bilateral idiopathic hyperaldosteronism (IHA), which have different etiologies. Recently, it was reported that the prevalence of obesity was higher in patients with IHA than those with APA, suggesting that there is a link between obesity and the etiology of IHA (Ohno Y et al. *J Clin Endocrinol Metab* 2018). Furthermore, it has also been reported that female patients with PA are more likely to have IHA than male patients.

**Objective:** Our objective was to clarify the pathological role of female gender in the positive association of obesity with IHA. Because of the difference of body fat distribution between men and women, we also investigate the contribution of visceral and subcutaneous fats in the pathogenesis of IHA.

**Design:** This retrospective observational study comprised 117 PA patients (IHA: n = 73, APA: n = 44) diagnosed by adrenal venous sampling between January 2006 and July 2019 at Jichi Medical University Hospital. We compared prevalence of obesity and metabolic parameters including visceral and subcutaneous fat areas measured by computed tomography between patients with IHA and APA by gender. We also compared visceral and subcutaneous fat areas between patients with IHA and APA by the presence of obesity, BMI  $\geq 25$  kg/m<sup>2</sup> (the diagnosis criteria by Japan Society for the Study of Obesity).

**Results:** In consistent with previous reports, BMI was significantly higher in patients with IHA than those with APA. However, in male patients, no difference of BMI between IHA and APA was observed. By contrast, in female patients, not only BMI but also both visceral and subcutaneous fat areas were significantly higher in IHA than in APA. Next,

we investigated the contribution of visceral and subcutaneous fats in the positive association of obesity with IHA in female patients. Subcutaneous fat area but not visceral fat area was significantly higher in female obese patients with IHA. By contrast, visceral fat area but not subcutaneous fat area was significantly higher in female non-obese patients with IHA.

**Conclusions:** These results suggest that obesity, especially subcutaneous fat accumulation, contributes to the pathogenesis of IHA in female patients.

## Thyroid

### THYROID NEOPLASIA AND CANCER

#### *Quality of Life in Patients with Papillary Thyroid Microcarcinoma According to the Treatment: Total Thyroidectomy Versus Total Thyroidectomy with Radioactive Iodine Remnant Ablation*

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#### MON-494

**Background:** Recently, the role of radioactive iodine (RAI) ablation in the treatment of low risk differentiated thyroid carcinoma (DTC), especially for papillary thyroid microcarcinoma (PTMC), is controversial. This study aims to compare quality of life (QoL) parameters in patients with PTMC underwent total thyroidectomy (TT) versus TT with RAI ablation.

**Methods:** In this cross-sectional study, patients with PTMC who underwent TT with/without RAI remnant ablation were prospectively enrolled between June 2016 and October 2017. All patients completed three questionnaires: 12-item short-form health survey (SF-12), thyroid cancer specific quality of life (THYCA-QOL), and fear of progression (FoP). **Results:** The TT and TT with RAI groups comprised 107 and 183 patients, respectively. The TT with RAI group had significantly lower serum TSH level than TT group. However, after matching of TSH level between the groups (TT with RAI = 100, TT = 100), there was no significant difference in baseline characteristics. According to the SF-12, the score for general health showed significantly lower in TT with RAI group than TT group ( $p = 0.047$ ). The THYCA-QOL also showed statistically significant difference in felt chilly score between the groups ( $p = 0.023$ ). No significant differences in FoP scores were seen between the groups.

**Conclusion:** Patients with PTMC underwent TT with RAI ablation experienced more health-related problems than those managed by TT alone. These findings support RAI ablation should be carefully determined in patients with low-risk DTCs.

## Neuroendocrinology and Pituitary

### NEUROENDOCRINOLOGY AND PITUITARY

#### *Diagnostic Value of Copeptin in Central Diabetes Insipidus*

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